

126-5-3-17/31

On Accelerating the Ageing of Alloys of Aluminium with Magnesium
Under the Influence of Small Admixtures of Silver and Zinc.
(On the Causes of the Influences of Small Admixtures on the
Kinetics of Ageing of Alloys III)

to the intersection of the conode passing through the point of the composition of the alloy with the isotherm delimiting the phase region which encloses the composition of the alloy, and not the solubility which corresponds to the intersection of the straight line passing through the point of the composition of the ternary alloy parallel to the side of the concentration triangle. If this isotherm is intersected from the side of the concentration triangle at an acute angle and has a large length, then even a small admixture may bring about appreciable change of the saturation of the solid solution. If the angle of the intersection of the isotherm from the side of the triangle is large and the length of the isotherm is small, even a large admixture will have little influence on the saturation of an ageing alloy. In this second case a change of the kinetics of ageing under the influence of

Card 5/6 admixtures can be due to the effect of internal adsorption.

126-5-3-17/31

On Accelerating the Ageing of Alloys of Aluminium with Magnesium
Under the Influence of Small Admixtures of Silver and Zinc.
(On the Causes of the Influences of Small Admixtures on the
Kinetics of Ageing of Alloys III)

There are 9 figures, 5 tables and 13 references, 7 of
which are Soviet, 3 English, 3 German.

ASSOCIATIONS: Ural'skiy gosudarstvennyy universitet imeni
A. M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)
Sverdlovskiy filial VNIIM (Sverdlovsk Branch of VNIIM)

SUBMITTED: July 17, 1957

- 1. Aluminum-magnesium alloys--Aging
- 2. Silver--Metallurgical effects
- 3. Zinc--Metallurgical effects

Card 6/6

APPROVED FOR RELEASE: 08/31/2001

CIA-RDP86-00513R001031330001-9

SOV/126-6-5-6/43

AUTHORS: Arkharov, V.I. and Magat, L.M.

TITLE: The Effect of Small Amounts of Silver or Zinc
Impurities on the Process of Ageing in Aluminium-Copper
Alloys (O vliyaniy malykh primesey serebra ili tsinka
na protsess stareniya splavov alyuminiya s med'yu)
(The Problem of the Causes of the Effect of Small Amounts
of Impurities on the Kinetics of Ageing of Alloys.)
(K voprosu o prichinakh vliyaniya malykh primesey na
kinetiku stareniya splavov. Y)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1956, Vol 6,
Nr 5, pp 804 - 808 (USSR)

ABSTRACT: This paper is part of a series; for previous work
see Arkharov et al. (Ref 1). 31 aluminium-copper
(0.5-4% Cu) alloys with small amounts of Ag (0.05-0.5%)
and Zn (0.2-4%) were prepared. Their compositions are
given in a table on p 805. Very pure materials were
used to make the alloys. The components were melted
in a carbon crucible at about 900 °C. Cast ingots were
compression-deformed by 75%, annealed at 550 °C for
10-20 hours and quenched in water. Experiments were
carried out on these alloys to determine the effect of
Ag and Zn: (A) on ageing of aluminium-copper alloys

Card1/4

SOV/126-6-5-c/43

The Effect of Small Amounts of Silver or Zinc Impurities on the Process of Ageing in Aluminium-Copper Alloys (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys. \bar{V})

by finding the dependence of the lattice constants of the alloys on the duration of ageing (Figures 1, 2) and, (B) on solubility of copper in aluminium, by finding the dependence of the lattice constants of the Al-Cu alloys on the Cu content (Figure 3). The samples used in the (A) tests were hardened and aged at 245 °C and those used in the (B) tests were hardened, compression-deformed by 75%, annealed at 300 and 400 °C for 60 and 20 hours, respectively, hardened again and aged at 245 °C. A KROS-1 X-ray camera, with copper radiation ($K_{\alpha 1}$ lines),

was used to obtain the lattice constants d_{hkl} within ± 0.0005 Å units. The results are given in Figures 1-3. Figure 4 shows the Al corner of the Al-Cu-Zn phase diagram at 460 °C. The authors make the following conclusions from the results obtained. 1) Addition of Ag (0.05-0.5%) and Zn (0.2%) was found to have a weak decelerating effect on decomposition of the supersaturated solution of copper in aluminium during the initial hours

Card2/4

SOV/126-6-5-6/43

The Effect of Small Amounts of Silver or Zinc Impurities on the Process of Ageing in Aluminium-Copper Alloys (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys. V)

of ageing at 245 °C. 2) Introduction of Ag or Zn into the Al + 4% Cu alloy which is being aged increases solubility of Cu in Al. This increase of solubility is small when small amounts of Ag or Zn are added but it becomes considerable when larger amounts of the impurities are used. It follows, therefore, that the decelerating effect of Ag and Zn on ageing of the Al-Cu alloys cannot be explained by a change in the degree of supersaturation of the solid solution as a whole. 3) The decelerating effect of small amounts of Ag or Zn is ascribed to their internal adsorption on pre-transition formations in the supersaturated solid solution. Such an adsorption increases solubility of copper in the regions which are rich in Ag or Zn and slows down formation of nuclei of the new phase.

Card3/4

SOV/126-6-5-6/43

The Effect of Small Amounts of Silver or Zinc Impurities on the Process of Ageing in Aluminium-Copper Alloys (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys. V)

There are 4 figures, 1 table and 7 references, 6 of which are Soviet and 1 English.

ASSOCIATIONS: Institut fiziki metallov Ural'skogo filiala AN SSSR (Institute of Metal Physics of the Ural Branch of the Ac.Sc.USSR)
Sverdlovskiy filial VNIIM (Sverdlovsk Branch of vNIIM)

SUBMITTED: February 26, 1958

Card 4/4

SOV/126-6-5-7/43

AUTHORS: Arkharov, V.I., and Magat, L.M.

TITLE: The Simultaneous Effect of Small Amounts of Cadmium and Silver or Zinc Impurities on the Process of Ageing of Aluminium-Copper Alloys (O sovmetnom vliyanii malykh primesey kadmia i serebra ili tsinka na protsess stareniya splavov alyuminiya s med'yu) (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys. VI) (K voprosu o prichinakh vliyaniya malykh primesey na kinetiku stareniya splavov. VI)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 5, pp 809 - 811 (USSR)

ABSTRACT: For Part V, see the preceding paper (Ref 1). Eight aluminium-copper (4% Cu) alloys were prepared with small amounts of Cd (0.05%), Cd+Ag (together) (0.05-0.5% Ag) and Cd+Zn (0.5 - 1.0% Zn). The technique of preparation and testing of the samples was described by the authors in Part V (Ref 1). They studied the simultaneous effect of Cd+Ag or Cd+Zn on ageing of Al-Cu alloys at the stages when Cd accelerates, while Ag and Zn slow down decomposition of the supersaturated solid solution in these alloys. The effect of Cd, Ag and Zn was deduced

Card1/3

SOV/126-6-5-7/43

The Simultaneous Effect of Small Amounts of Cadmium and Silver or Zinc Impurities on the Process of Ageing of Aluminium-Copper Alloys (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys)

from curves (Figures 1 and 2) showing the dependence of the lattice constant on the duration of ageing at 245 °C. It was found that 0.05% Cd accelerates ageing of the Al+4% Cu alloy at 245 °C (Figure 1, Curve 1). Addition of Ag to the Al+4%Cu+0.05%Cd alloy decreases the effect of Cd (Figure 1, Curves 2-5). The accelerating effect of Cd decreases with increase of the amount of Ag until at 0.5% Ag the effect of Cd is completely nullified, (Figure 1, Curve 5). It is suggested that the simultaneous action of Ag and Cd is due to internal adsorption of these two metals in aluminium-copper alloys. Addition of Zn to the Al+4%Cu+0.05%Cd alloy has only a very small effect on the rate of decomposition of the solid solution in the alloy (Figure 2). There are 2 figures, 1 table and 8 references, 4 of which are Soviet and 4 English.

Card2/3

SOV/126-6-5-7/43

The Simultaneous Effect of Small Amounts of Cadmium and Silver or Zinc Impurities on the Process of Ageing of Aluminium-Copper Alloys (The Problem of the Causes of the Effect of Small Amounts of Impurities on the Kinetics of Ageing of Alloys)

ASSOCIATIONS: Institut fiziki metallov Ural'skogo filiala AN SSSR
(Institute of Metal Physics of the Ural Branch of the Ac.Sc.USSR)
Sverdlovskiy filial VNIIM (Sverdlovsk Branch of VNIIM)

SUBMITTED: February 26, 1958

Card 3/3

69702

S/126/60/009/03/028/033

E032/E414

18.1141

AUTHORS: Glazer, A.A., Magat, L.M. and Shur, Ya.S.

TITLE: Thermomagnetic Treatment and Ordering Processes. IV.
A Study of the Effect of Thermomagnetic Treatment on
the Crystal Lattice Parameter in the Case of Ordering
Soft Magnetic Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 3,
pp 467-469 (USSR)

ABSTRACT: It has been shown experimentally that thermomagnetic
treatment (cooling in a magnetic field) in the case of
soft magnetic materials, which leads to the appearance
in the ferromagnetic of single axis magnetism, is
effective only in ordering alloys. In the present work,
a study was made of the crystal lattice parameter in the
case of 78-permalloy (78% Ni, 22% Fe) and perminvar
(34% Fe, 29% Co, 34% Ni, 3% Mo). The specimens were in
the form of strips 60 x 4 x 0.2 mm. The magnetic and
electrical properties of the specimens were reported
earlier (Ref 1,2). The lattice parameter was determined
for specimens in different structural states namely.

Card 1/3 disordered, ordered, after thermomagnetic treatment, and

69702

S/126/60/009/03/028/033
E032/E414

Thermomagnetic Treatment and Ordering Processes. IV. A Study of the Effect of Thermomagnetic Treatment on the Crystal Lattice Parameter in the Case of Ordering Soft Magnetic Alloys

after annealing in the absence of the field. The disordered specimens were obtained by quenching from 700° and the ordered by 100-hour annealing at 450°. Thermomagnetic treatment consisted in the cooling of the specimens from 700 to 300° in a field of 200 oersted. The lattice parameter was determined by X-ray diffraction methods. The results obtained are summarized in a table on p 469 for 78-permalloy and perminvar specimens after the following heat treatments: quenching from 700°C (disordered), annealing at 450°C for 100 hours (ordered), cooling from 700°C at the rate of 200°C/hr in a magnetic field, cooling from 700°C at the rate of 200°C/hr with the field on. The following values are given: H_c , Oe (2nd and 5th columns); $\lambda_s \cdot 10^6$ (3rd and 6th columns) and the lattice parameter at 20°C in Å (4th and 7th columns). As can be seen from this table, thermomagnetic treatment has very little effect on the lattice parameter. This indicates that the structural

Card 2/3

69702

S/126/60/009/03/028/033
E032/E414

Thermomagnetic Treatment and Ordering Processes. IV. A Study
of the Effect of Thermomagnetic Treatment on the Crystal Lattice
Parameter in the Case of Ordering Soft Magnetic Alloys

changes which take place on annealing in a field,
appear to confirm the hypothesis that only a small
proportion of atoms take part in the setting up of the
single axis magnetism which is produced as a result of
thermomagnetic treatment. The usual ordering process
does not play an important part in the mechanism of
thermomagnetic treatment. There are 1 table and
4 references, 3 of which are Soviet and 1 English.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

4

SUBMITTED: July 15, 1959

Card 3/3

S/126/62/013/002/004/019
E073/E535

18.11.92
AUTHORS: Magat, L.M., Luzhinskaya, M.G. and Shur, Ya.S.
TITLE: Change in the magnetic and crystalline structure of
Vicalloy during tempering
PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.2, 1962,
192-198
TEXT: To elucidate the nature of the high coercive force of
Vicalloy, further structure investigations combined with
measurement of the basic magnetic characteristics are necessary.
The authors carried out X-ray diffraction studies of the fine
structure of the alloy, determining the dimensions of the mosaic
blocks and the size of micro-deformations corresponding to type II
stresses. In addition, the coercive force, the saturation
magnetization and the residual magnetization were measured, as
well as the hardness of the specimens. In the experiments an
alloy containing 12% V, 52% Co, rest Fe was used. The specimens
were first drawn with a large reduction so that, after a suitable
heat treatment, optimum magnetic properties were obtained. The
measurements were made on specimens that had been tempered within
Card 1/4

Change in the magnetic ...

S/126/62/013/002/004/019
E073/E535

a wide range of temperatures (300 to 650°C). The magnetic characteristics were measured ballistically on cylindrical specimens and, after these measurements, flat specimens were cut from the cylindrical ones for X-ray analysis and hardness tests. Fig.1 shows the dependence of micro-deformations $\Delta a/a$ and of the block size D of the α -phase, the hardness H_D (kg/mm²), the coercive force H_c (Oe) and of the quantity $4\pi I_s$, and of the residual magnetization j_r of Vicalloy on the tempering temperature, °C, for a holding time of one hour. Fig.2 gives curves of the same values as Fig.1 for a constant tempering temperature of 580°C as a function of the holding time, hours. It was found that the high coercive force H_c is associated with a certain stage of formation of the non-ferromagnetic γ -phase, which is accompanied by a change in the block dimensions and the micro-deformations of the ferromagnetic α -phase. In the high coercive state of the alloy, the dimensions of the blocks of the α -phase are of the order of hundreds of Angstrom, which corresponds to the predicted theory of the dimensions of single-domain formations. The size of the γ -phase blocks are of the same order. Comparing the

Card 2/5

Change in the magnetic ...

S/126/62/013/002/004/019
E073/E535

results with those of studies of the magnetic properties, the mechanism of formation of a high coercive force in Vicalloy is explained as follows. In the untempered state, the alloy has a multi-domain magnetic structure. During low temperature tempering, the γ -phase forms along the boundaries of the α -phase blocks in the form of thin interstices which constitute a barrier against displacement of the boundaries between the domains. Therefore, even for small quantities of the γ -phase, the magnetic structure will approach the single domain structure. If the tempering temperature and the quantity of γ -phase are increased, the magnetic structure becomes a single domain one due to a further splitting of the α -phase blocks by the γ -phase and to a reduction of the dimensions of the α -phase blocks. After high temperature tempering, the dispersion of the phases decreases and the conditions for the existence of a single domain magnetic structure cease to exist. Thus, the increase in H_c is due to the development of a single domain structure. Of considerable importance also is the magneto-crystalline anisotropy of the α -phase, which is small after low temperature

Card 3/5

Change in the magnetic ...

S/126/62/013/002/004/019
E073/E535

tempering and reaches maximum values at tempering temperatures that are higher than those which are suitable for obtaining a single domain magnetic structure. Maximum H_c values are obtained if in addition to the existence of a single domain structure, the material has a sufficiently large natural crystalline magnetic anisotropy. There are 2 figures and 1 table.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AS USSR)

SUBMITTED: May 5, 1961

Card 4/5

S/126/62/014/003/016/022
E073/E420

AUTHORS: Shur, Ya.S., Magat, L.M., Yermolenko, A.S.

TITLE: On the relation between the crystal structure and the magnetic properties of alnico

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.3, 1962, 458-461

TEXT: So far, the nature of the structural transformations which lead to a reversible change in the magnetic properties of alnico has not been resolved and the authors considered it of interest to try to observe these transformations by accurate measurement of the lattice parameters and a determination of the average distance between defects from the positions of the satellites on the X-ray spectra. Specimens in the form of discs and plates cut from single crystals in the plane (100) of the alloy (24% Co, 14% Ni, 8% Al, 3% Cu, remainder Fe) were used in studying the temperature dependence of the coercive force and the saturation magnetization by means of a rotary magnetometer. It was found that these properties do not depend on the preceding heat treatment but are determined solely by the last tempering temperature, which
Card 1/3

S/126/62/014/003/016/022
E073/E420

On the relation between ...

indicates that the magnetic properties of coherent defects and of the matrix change reversibly with changing temperature. Regardless of the previous heat treatment, tempering at 560°C led to the same value of the lattice parameters. Further heating to higher temperatures brings about an increase in the lattice parameter which approaches the value pertaining to a specimen quenched from 1250°C; tempering at 560 to 750°C leads relatively quickly to a certain state of the solid solution for each temperature regardless of the previous heat treatment. It is concluded that when cooling from 1250°C at a critical rate defects form which are coherently interconnected with the matrix and are distributed more or less periodically; the lattice parameter of the solid solution decreases somewhat which probably occurs owing to defects in the γ_2 phase. Due to these structural changes, the coercive force increases. Tempering at 560°C leads to a further change in the state of the solid solution and to a redistribution of the components between the matrix and the coherent defects. The obtained data indicate that the reversible changes in the saturation magnetization and the

Card 2/3

On the relation between ...

S/126/62/014/003/016/022
E073/E420

coercive force of alnico are due to reversible changes in the state of the matrix and coherent defects corresponding to the equilibrium phases β_2 and β ; the irreversible changes in the coercive force are due to irreversible growth of coherent defects. There are 1 figure and 1 table.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

SUBMITTED: July 11, 1962

Card 3/3

MAGAT, L.M.

Some diffusion effects near superstructural reflections on X-ray
photographs of the alnico alloy. Ukr. fiz. zhur. 8 no.2:270-272 F '63.
(MIRA 16:2)

1. Institut fiziki metallova AN SSSR, Sverdlovsk.
(Radiography) (Aluminum-nickel-cobalt alloys)

S/126/63/015/001/006/029
E039/E435

AUTHOR: Magat, L.M.

TITLE: On the initial stages of disintegration of super-saturated solid solutions in alloys of the alnico type

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.1, 1963, 60-62

TEXT: The initial stages of the process of separation of the β -phase with time of annealing after hardening was investigated by means of X-ray diffraction for single crystals of an alloy containing 51% Fe, 24% Co, 14% Ni, 8% Al and 3% Cu (by weight). The samples were water quenched from 1250°C. The period of modulation was determined from the position of satellites in the X-ray diffraction pattern and the size of the spherical Guinier-Preston (C.P.) zones from the diffusion effect near the super-lattice reflections. Typical results are: for the hardened sample, size of G.P. zone 60 to 80 kX and period of modulation 200 kX. After annealing for 40 hours at 550°C these values are 90 and 200 kX respectively and after 2 hours at 670°C 200 and 270 kX. This illustrates that annealing at less than

Card 1/2

S/126/63/015/001/006/029
E039/E435

On the initial stages ...

600°C for tens of hours increases the size of the G.P. zone without a corresponding increase in the period of modulation. It is concluded that in this alloy the separation of the β -phase begins with the formation of spherical G.P. zones followed by the formation of a modulated structure. There are 1 figure and 1 table. ✓

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

SUBMITTED: June 26, 1962

Card 2/2

ACCESSION NR: AP4017367

S/0126/64/017/002/0296/0298

AUTHORS: Magat, L. M.; Shur, Ya. S.; Melkisheva, E. N.

TITLE: The relation of the coercive force to the initial decomposition stages in an oversaturated solid solution in the alnico alloys

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 2, 1964, 296-298

TOPIC TAGS: alnico alloy, alni alloy, niobium-alnico alloy, alloying, over-saturated solid solution, solution decomposition, coercive force, modulation period, Guignet-Preston zone, tempering

ABSTRACT: The following alloys were studied by the method of x-ray analysis: alni (30% Ni, 14% Al); alnico (14% Ni, 8% Al, 24% Co, 3% Cu); Nb-alnico (14% Ni, 8% Al, 24% Co, 3% Cu, 0.9% Nb). The size of the spherical Guignet-Preston zones was determined from the scattering of x-rays in the Laue diffraction pattern, and the modulation period was determined from the position of satellites on the x-ray patterns of rotation. The coercive force was measured ballistically. Figure 1. on the Enclosure shows the results obtained. It was ascertained that the decomposition of a solid solution during tempering started with the formation of the Guignet-Preston zones which were replaced subsequently by a periodical modulation structure.

Card 1/3

0
51"
6
2
ACCESSION NR: AP4017367

The growth of the coercive force during tempering started during the formation of the Guignet-Preston zones and reached its maximum during the second stage at a certain optimal magnitude of the modulation period. The above conclusions were true for all the types of the alloy studied. It was also proved that the satellites observed on the x-ray patterns of rotation correspond to a periodical modulated structure. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AN SSSR)

SUBMITTED: 10Jul63

DATE ACQ: 18Mar64

ENCL: 01

SUB CODE: ML

NO REF SOV: 004

OTHER: 004

Card 2/3

L 26633-66 EWT(m) JD/HW/JH

ACC NR: AP5025341

SOURCE CODE: UR/0126/65/020/003/0478/0480

AUTHOR: Magat, L. M.

ORG: Institute of Metal Physics, AN SSSR (Institut fiziki metallov AN USSR)

TITLE: On the initial decomposition stages of a saturated solid solution in alloys based on an iron-nickel-aluminum system

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 3, 1965, 478-480

TOPIC TAGS: iron base alloy, nickel containing alloy, aluminum containing alloy, titanium containing alloy, cobalt containing alloy, solid solution, single crystal, tempering, x ray scattering

ABSTRACT: This study deals with the diffusion scattering of x-rays during the decomposition of saturated solid solution in Fe-Ni-Al-Ti and Fe-Ni-Al-Co-Ti alloys in which it is possible to observe the gradual transition from the spherical zones of Guinnet-Preston to the modulated structure. Also investigated were alloy monocrystals of 59% Fe, 28% Ni, 12% Al, 1% Ti and 54% Fe, 29% Ni, 12% Al, 5% Co, and 1% Ti. After tempering the sample of Fe-Ni-Al-Ti alloy in water from 1280°C, the x-ray of stationary crystals around 100 diffractions shown ring-like diffusion effects with some nonuniform distribution of intensity around the ring. At 110

Card 1/2

UDC: 620.193.91

L 26633-66

ACC NR: AP5025341

diffractions very weak satellites were observed and with the lowering of temperature to 600°C for a period of one hour the satellites were clearly visible. Similar phenomena were observed in alloys with the addition of 5% cobalt; however the decomposition process is somewhat slower. The simultaneous presence of ring-like effects and satellites has been established with Fe-Ni-Al-Ti and Fe-Ni-Al-Co-Ti alloys on the x-ray films by means of periodic space arrangement of the spherical coherent separations. Orig. art. has: 1 fig. and 1 table.

SUB CODE: 11,20/SUBM DATE: 10Feb65/ ORIG REF: 004/ OTH REF: 002

Card 2/2

L 00006-67 EWP(c)/EWT(m)/EWP(w)/EWP(t)/ETI/EWP(k) IJP(c) JD/JH

ACC NR: AP6027783

SOURCE CODE: UR/0126/66/022/001/0039/0044

AUTHOR: Shur, Ya. S.; Kandaurova, G. S.; Magat, L. M.; Bykhanova, N. N.

ORG: Institute of Metal Physics, AN SSSR (Institut fiziki metallov AN SSSR); Ural State University im. A. M. Gor'kiy (Ural'skiy gosuniversitet)

TITLE: Magnetic properties of powders of a high-coercivity Mn-Al alloy

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 1, 1966, 39-44

TOPIC TAGS: aluminum alloy, magnesium alloy, powder metal property, magnetic property, magnetic coercive force

ABSTRACT: In order to elucidate the mechanism of the processes leading to the increase in the coercive force of Mn-Al alloy when in powdered state, the magnetic properties and phase composition of powders of a Mn-Al alloy (71 wt. % Mn) were investigated as a function of particle size (2 to 800 μ) and heat treatment. Two series of powders were considered: the first series was obtained by pulverizing the alloy when it was in ferromagnetic state (homogenization at 1100°C with cooling in air at the critical rate of 20°C/sec, leading to the formation of the metastable ordered ferromagnetic τ -phase); the second series was obtained by pulver-

Card 1/3

UDC: 538.245/.248

L 09006-67
ACC NR: AP6027783

izing the alloy when it was in nonferromagnetic state (quenching in water following homogenization at 1100°C) and in this case the high-temperature paramagnetic ϵ - phase was deformed by supercooling. The magnetic properties of the specimens were measured in fields of up to 32,000 oe by the ballistic method, while their phase composition was determined from debye-grams. Findings: for both series of powder specimens coercive force H_c increases and specific magnetization σ_{max} decreases with decrease in particle size. Thus, a particle size decreases from 500 to 2 μ , H_c increases from 1300-2000 oe to 5000 oe, while specific magnetization then decreases 4-7 times for powders in the first series and about 2 times for powders in the second series. An examination of the anisotropy of coercive force in the specimens warrants the assumption that for specimens with particle size of $<4 \mu$ magnetic properties are primarily determined by particles with a nearly monodomain structure, and it is this that accounts for the increase in coercive force. The decrease in specific magnetization with decrease in particle size is attributed to the dis-ordering of the magnetic τ -phase and the formation of paramagnetic equilibrium phases. Deformation of the alloy apparently leads to a decrease in the effective dimension of ordered regions of the ferromagnetic τ -phase and to greater isolation of these regions from each other within the powder particles. This complicates the processes of magnetization reversal and increases the coercive force. The decrease in the effective size of the τ -phase may be attributed, for the first series of powders, to local dis-ordering of the τ -phase during pulverization of the alloy in ferromagnetic state, and for the

1. 09006-67

ACC NR: AP6027783

second series of powders -- to the formation of nonmagnetic equilibrium phases. "The authors consider it their pleasant duty to express their appreciation to L. V. Smirnov for providing the Mn-Al alloy." Orig. art. has: 2 figures, 1 table.

SUB CODE: 11,15,20/ SUBM DATE: 01Dec65/ ORIG REF: 002/ OTH REF: 005

Card 3/3 nst

MAGATAYEV, K. S.

Magatayev, K. S. - Determination of Age Sediments in the Oil-Producing Provinces of the Dagestan ASSR.

The Sixth Session of the Committee for Determining the Absolute Age of Geologic Formations at the Department of Geologic-Geographical Sciences (OGGN) of the USSR Academy of Sciences at Sverdlovsk in May 1957

Izv. Ak Nauk SSSR, Ser. Geol., No. 1, 1958, p. 115-117 author Pekarskaya, T. B.

20-4-37/52
AUTHORS: Amirkhanov, Kh. I., Member of AN Azerb.
SSR, Magatayev, K. S., and Brandt, S. B.

TITLE: Determination of the Absolute Age of Sedimentary Minerals
by Radioactive Methods (Opredeleniye absolyutnogo vozrasta
osadochnykh mineralov radioaktivnymi metodami).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 4, pp. 675-677 (USSR)

ABSTRACT: Though most of the works deal with the determination of the
age of eruptive rocks and minerals, the primary conditions
of radioactive geochronometry can also be applied with
depositions. That requires that a precipitating mineral
contains a radioactive mother-rock, and further that the
developing daughter-rock remains well conserved in the
mineral and that it is not contained in the mineral in the
moment of precipitation. Finally it is required that the
moment of formation of the respective mineral agrees with the
moment of precipitation of all other sediments of the
respective horizon containing it. Since the absolute age
of the sylvinite could be determined (reference 1), this
problem was attacked with respect to an authigenic mineral -
glauconite (reference 2). The age of 45 samples, altogether,
was determined. 26 measurements agree quite precisely with the

Card 1/3

Determination of the Absolute Age of Sedimentary
Minerals by Radioactive Methods

20-4-37/52

geological data. In 11 samples, radiogenic argon was not found, whereas in 8 cases - on account of too small quantities of argon - the rocks are of lower age. In no case an increased age was determined. From this it can be concluded that radiogenic argon was fully obtained in many samples. This obtaining concerns a wide range of geologic ages. In one part of the samples, the quantity of radiogenic argon was rigorously reduced up to completely lacking. The respective results are given in table 1. The age varies accordingly from 20 (Chokrak, miocene) to 400 (silurian) million years. The too small quantity of radiogenic argon can be attributed to paleo-temperature effects, metamorphic processes, local warming-up and weathering with glauconite. They act here more intensely than with magmatic rocks. Concluding, the applications of the new method are described. There are 1 figure, 1 table, and 5 references, 4 of which are Slavic.

Card 2/3

Determination of the Absolute Age of Sedimentary
Minerals by Radioactive Methods

20-4-37/52

ASSOCIATION: Daghestan Branch AN USSR (Dagestanskiy filial Akademii nauk
SSSR)

SUBMITTED: July 2, 1957

AVAILABLE: Library of Congress

Card 3/3

MAGATAYEV, K.S.; MUSSAYEV, S.E.; MIRZOYEV, D.A.

Development of geological prospecting on the plains of northern
Daghestan. Trudy Geol.inst.Dag.fil. AN SSSR 2:88-97 '60.
(MIRA 15:12)

(Daghestan--Prospecting)

TIMOFEYEV, G.I.; MAGATAYEV, K.S.

Qualitative and quantitative characteristics of bitumens in
Bathonian and Bajocian sediments of Daghestan. Trudy Geol. inst.
Dag.fil. AN SSSR 2:105-110 '60. (MIRA 15:12)
(Daghestan—Bitumen—Geology)

TIMOFEYEV, G.I.; MAGATAYEV, K.S.

Nitrogen and the ratio of carbon to nitrogen in Bathonian and
Bajocian sediments of Daghestan and their importance in the
delineation of oil producing series. Trudy Geol.inst.Dag.fil.
AN SSSR 2:118-127 '60. (MIRA 15:12)

(Daghestan--Petroleum geology)
(Daghestan--Rocks, Sedimentary--Analysis)

MAGATAYEV, K.S.; PATRUSHEVA, V.D.; KOMAROV, V.P.

Study of spherosiderites as weighting material of clay mds.
Trudy Geol.inst.Dag.fil. AN SSSR 2:204-212 '60. (MIRA 15:12)
(Samur Valley—Spherosiderite)
(Oil well drilling fluids)

S/169/62/000/010/018/071
D228/D307

AUTHORS: Amirkhanov, Kh.I., Dzhamalov, S.A., Magatayev, K.S.,
Kusayev, S.Ye. and Bydtayev, A.B.

TITLE: Geothermal investigations in Dagestan

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 10, 1962, 17-18,
abstract 10A111 (In collection: Probl. geotermii i
prakt. ispol'zovaniya tepla Zemli, v. 2. M., AN SSSR,
1961, 167-170)

TEXT: A description is given of the results of work by the
Dagestanskiy filial AN SSSR (Dagestan Branch, AS USSR) on the study
of geothermal phenomena in the region of Dagestan's Tertiary depos-
its. Upper Cretaceous and Tertiary deposits in the plains part of
the territory are the most perspective for hot water. The following
tentative conclusions were drawn on the basis of this research.

1. The temperature growth magnitude decreases with depth. 2. Deep
temperature changes depend on the underground water movement. The
heat conductivity of wet rocks is very much higher, so that the

Card 1/2

Geothermal investigations ...

S/169/62/000/010/018/071
D228/D307

temperature leveling in them proceeds more intensively. 3. It can be established from graphs of the temperature change with depth in different areas, and from geothermal charts compiled by the Dagestan Branch, AS USSR, that a region's geologic structure does not always correspond to the temperature change.

[Abstracter's note: Complete translation.]

Card 2/2

MAGATH, A.

Infiltration anesthesia in combination with intravenous in
gynecologic surgery. Bratisl. lek. listy 30 no.3:216-225
Mar. 1950. (CML 20:1)

1. Of the Obstetrical and Women's Department of the State
Hospital in Humenne.

MAGATH A.

Cinrost' prenatalnej poradne a jej kriteria. /Activity of prenatal
consultation and its criteria/ Sloven. lekar 12:6 June 50 p. 302-15.

1. Of the Consultation Center for Pregnant Women of the National
Institute of Health in Ljubljana.
Glas Vol. 20, No.2 Feb 1951

MAGATH, A. (OUNZ, Trnava)

Author's name in Czech

Certain provisions for the improvement of health services for women. Lek. obzor 3 no.3-4:180-185 1954.

1. Z gynekologicko-porodnickeho odd. OUNZ v Humennom.
(MATERNAL WELFARE,
*in Czech.)
(GYNECOLOGY,
*in Czech., organiz. of med. care)

MAGATH, A., OUNZ, Trnava

Principles of examination at antisterility consultation centers.
Lek. obzor 3 no.7-8:391-398 1954.

1. Z antisterilitnej poradne pri ginekologickom oddeleni OUNZ -
Okr. nemocnice v Huzennom
(STERILITY, diagnosis
exam. principles at constultation centers)

MAGATH, A., OUNZ, Trnava

WILSON, J. 1990: 220-221.

Occurrence of uterus rupture during labor. Lek obzor 3 no.7-8:416-419 1954.

1. Z gyn. por. oddelenia OUNZ Humenne
(UTERUS, rupture
in labor, statist. Czech.)
(LABOR, complications
rupt. of uterus, statist. Czech.)

MAGATH, A.

Clinico-anatomical considerations on hemorrhagic cervical erosions.
Bratisl. lek. listy 34 no.8:915-922 Aug 54.

1. Z Gynekologicko-porodnického odd. OUNZ v Humennom, prednosta
dr. A. Magath.

(CERVIX, UTERINE, diseases,
erosion, contract hemorrhagic, cytol. aspects)

(UTERUS, hemorrhage,
causing cervical erosion, cytol. aspects)

EXCERPTA MEDICA Sec.16 Vol.4/12 Cancer Dec 56

4479. MAGÁTH A. Patol.-Anat. Úst., Univ. Karlova, Bratislava; Gynecol.-Přodn. Odd. OUNZ-Nemocnice, Trnava. *Kotázka histopatologie a klinického hodnocení premaligných změn na jazyčku maternice* *The histopathology and clinical evaluation of premalignant changes of the cervix* Lek. Obzor, 1955, 4 10 : 580-588; Illus. 4. A total of 1469 cervical biopsies from 32 gynaecological departments, with the diagnosis of suspect erosion, were examined: 1192 cases (80%) were unsuspect, 194 (14%) were carcinomas, 93 (6%) were not quite normal and required further observation. The author received a report of the further course of 29 cases. Later on various operations were carried out in some of these patients, (in 1 case vaginal hysterectomy on account of uterine prolapse, in 5 abdominal hysterectomy, and in 1 amputation of the cervix because of leucoplakia). No malignant changes were observed in the operation specimens. Twenty patients were not operated on: 15 of them showed a normal cervix at examination, 3 had unsuspect erosions, and in 2, suspect erosion was again diagnosed; 1 of these proved benign and the other was followed up. In only one case, biopsy after 2.5 months revealed infiltrative carcinoma. At operation (according to Wertheim) the parametrium was shown to be infiltrated.

Janisch-Raskovic - Berlin

MAGAY, A.

Hungarian
Technical
Abst. Vol. 5
No. 4 1953

16. Two gauge heads manufactured in Hungary - Két hazailag gyártott tapintófej - A. Magay. (Hungarian Engineering - Magyar Technika - Vol. 7, 1952, No. 12, pp. 701 - 703, 4 figs.)

Both of these instruments operate on the principle of changes in bridge voltage. One of the instruments is used as a thickness gauge and has a range of 100 microns with an accuracy of one micron. A moving soft iron disc with a shaft ending in a hardened steel ball feeler is mounted in the gap between two inductance coils facing each other. Any slight movement of the disc changes the a.c. resistance of the coils and thus changes the bridge voltage causing a deflection of the pointer of the connected instrument. The gauge is mounted on an arm which can be traversed along a column for a rough adjustment. The other instrument serves for gauging the thickness of diamagnetic layers (paint, enamel, non-ferrous coatings, etc.) over a paramagnetic base. The gauging head is similar to the one described above but the instrument is supported at 3 points; at the iron core of the coils and at the two legs of the iron body. The magnetic circuit of one of the coils is closed by the iron body and the iron disc while the circuit of the other coil is closed by the layer to be gauged (over)

which forms a magnetic resistance. The air gap of the disc is adjustable externally. 0.1 to 5 mm thick layers can be measured with the instrument with an accuracy of 1 to 2 per cent.

R. Erdős

8-18-54
[Signature]

MAGAY, A.B.

Practice of using bottom structures with an alluvium collecting
trench for the intake of water. Trudy Inst. energ. AN Kazakh. SSR
2:183-187 '60. (MIRA 15:1)

(Hydraulic structures)

MAGAY, A.B.

Some results of the laboratory study of a water flow around the
bend in an open flume. Trudy Inst.energ.AN Kazakh.SSR 3:167-
177 '61. (MIRA 14:12)

(Hydrodynamics)

MAGAY, Ferenc, dr.

Solid fats and their medicinal use. Gyogyszeresz 9 no.5:90-92 Ky '54.

(FATS

*solid fat, pharmaceutical use)

KOSOV, A.P.; MAGAY, L.I.; NIKULEN, B.K.; PAK, M.S.; RUDAKOV, G.M.;
SAYFI, E.KH.; SERGIYENKO, V.A.; SOKOLOV, F.A.; SPIRIDONOV,
P.V.; SHPOLYANSKIY, D.M.; TIKHONOVA, I., red.

[Overall mechanization and cultivation practices for cotton
crops] Kompleksnaia mekhanizatsiia i agrotekhnika khlop-
chatnika. Tashkent, Gos.izd-vo Uzoekskoi SSR, 1964. 407 p.
(MIRA 17:11)

1. Sredneaziatskiy institut mekhanizatsii i elektrifikatsii
sel'skogo khozyaystva. 2. Sredneaziatskiy institut mekhani-
zatsii i elektrifikatsii sel'skogo khozyaystva (for all
except Tikhonova).

DAVIDSON, A. M.; MAGAY, S. A.

Punching instead of cutting out. Mashinostroitel' no. 12:29
D '62. (MIRA 16:1)

(Forging)

MAGAYEVA, A.D.

The transformation of the botanical composition of grasses in the natural meadows
of the Oka River valley under the influence of nitrogen fertilizers

Dok AN SSSR, Vol 80, No 1, 1 Sep 51, p. 81

1. MAGAYEVA, A. D.
2. USSR (600)
4. Meadows
7. Effect of nitrogen fertilizers in improving natural meadows. Dost sel'khoz.
No. 1 1953.
9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

MAGAYEVA, A.D.

Grass yields of Oka meadows under varying applications of
nitrogen fertilizer. Bot.zhur. 38 no.6:805-816 N-D '53. (MLRa 7:1)

1. Vsesoyuznyy Institut kormov im. V.R.Vil'yamsa, Moskva.
(Oka Valley--Grasses) (Grasses--Oka Valley)

MAGAYEVA, A.D., starshiy nauchnyy sotrudnik

Methods for controlling horse sorrel. Zhivotnovodstvo 23
no.7:35 31 '61. (MIRA 16:2)

1. Tul'skaya oblastnaya sel'skokhozyaystvennaya opytnaya
stantsiya.

(Rumex)
(Weed control)

BLESHINSKIY, S.V.; MAGAYEVA, A.G.

Rapid volumetric analysis of zinc. Report No.1. Izv. AN Kir.
SSR. Ser. est. i tekhn. nauk 5 no.4:35-49 '63.

Rapid volumetric analysis of zinc. Report No.2. (51-58)
(MIRA 16:10)

MAGAYEVA, S.V. (Moskva)

Features of reactivity of the organism to the toxin of *Vibrio comma* in a changed environment. Pat.fiziol. i eksp.terap. 3
no.2:52-55 Mr-Apr '59. (MIRA 12:6)

1. Iz laboratorii infektsionnoy patologii (zav. - chlen-korrespondent AMN SSSR prof.A.Ya.Alymov) Instituta normal'noy i patologicheskoy fiziologii AMN SSSR (dir. - deystvitel'nyy chlen AMN SSSR prof.V.N.Chernigovskiy).

(VIBRIO, immunol.

body reactivity to toxin in change of external environment in rats (Rus))

(ENVIRONMENT, eff.

on body reactivity to *Vibrio* toxin in rats (Rus))

MAGAYEVA, S. V., Cand Biol Sci -- (diss) "Study of the pathogenesis of intoxication in gas gangrene. (From a model of experimental intoxication of animals by means of a toxin from septic vibrio /of the Spirillaceae family/)." Moscow, 1960. 14 pp; (Academy of Medical Sciences USSR); 210 copies; free; (KL, 26-60, 133)

MAGAYEVA, S.V.

Parabiotic nature of the nervous system's reaction in the development of intoxication in gas gangrene. Biul.eksp. biol. i med. 49 no.2:68-72 F '60. (MIRA 14:5)

1. Iz laboratorii infektsionnoy patologii (zav. - chlen-korrespondent AMN SSSR prof. A.Ya. Aymov, nauchnyy rukovoditel' - doktor meditsinskikh nauk O.Ya.Ostryy) Instituta normal'noy i patologicheskoy fiziologii (dir. - deystvitel'nyy chlen AMN SSSR V.N.Chernigovskiy) AMN SSSR, Moskva. Predstavlena deystvitel'nyy chlenom AMN SSSR V.N.Chernigovskim.
(GANGRENE) (NERVOUS SYSTEM)

7

OSTROY, O.YA., SOBIYEVA, Z.I., SKVIRSKAYA, E.A., MAGAYEVA, S.V.,
BABAYAN, S.A., STRUKOVA, L.G., VAKAR, M.D., AZHIPA, YA.I.

"The trophic function of the nervous system and the nervous
dystrophic process."

Report submitted, but not presented at the 22nd International
Congress of Physiological Sciences.
Leiden, the Netherlands 10-17 Sep 1962

MAGAYEVA, S.V.

Response of vascular- and tissue receptors of an extremity to the
toxin of a septic vibrio; an electrophysiological analysis. Dokl.
AN SSSR 148 no.3:720-723 Ja '63. (MIRA 16:2)

1. Institut normal'noy i patologicheskoy fiziologii AMN SSSR.
Predstavleno akademikom V.N. Chernigovskim.
(CLOSTRIDIUM SEPTICUM) (ELECTROPHYSIOLOGY)
(RECEPTORS (NEUROLOGY))

MAGAYEVA, S.V.

Characteristics of reflex disorders of regional blood circulation
during the development of neurodystrophic processes. Trudy Inst.
norm.i pat.fiziol. AMN SSSR 7:64-65 '64. (MIRA 18:6)

1. Laboratoriya nervnoy trofiki (zav. - prof. G.Ya.Ostryy) Instituta
normal'noy i patologicheskoy fiziologii AMN SSSR.

OSTRYI, O.Ya.; MAGAYEVA, S.V.

Disorders of afferent signalization in experimental conditioned
hypercholesteremia. Trudy Inst.norm.i pat.fiziol. AMN SSSR 7:68-
69 '64. (MIRA 18:6)

1. Laboratoriya nervnoy trofiki (rav. - prof. O.Ya.Ostryy)
Institute normal'noy i patologicheskoy fiziologii AMN SSSR.

MAGAZANIK, A.; RUBANOVSKIY, P.

Field work of students. Fin.1 kred. SSSR no.6:61-63 Jo '53. (MLRA 6:6)
(Finance--Study and teaching)

~~MAGAZINIE, A.~~

Some problems in the tax rate of producers' cooperatives. Fin.SSSR 17
no.6:65-66 Je '56. (MLRA 9:9)
(Cooperative societies--Taxation)

MAGAZANIK, A.

Recomputation of deductions from profits on a quarterly basis. Fin.SSSR 18 no.1:47-49 Ja '57.

(MLRA 10:2)

(Finance)

MAGAZANIK, A. (Kiyev)

Indices of the effectiveness of using working capital. Fin.
SSSR 21 no.5:44-47 My '60. (MIRA 13:7)
(Kiev--Shoe industry--Finance)

MAGAZANIK, A.

Some problems of payments to the budget. Fin.SSSR 23 no.5:55-
57 My '62. (MIRA 15:5)

(Finance)

Card : 1/1

Authors : Magazanik, A. A., Eng., laureate of the Stalin prize.

Title : A device for frequency control in the radio-channels of frequency telegraphy

Periodical : Vest. Svyaz, 5, 9 - 12, May 1954

Abstract : A device for measuring channel frequencies of the high-frequency telegraphy is described. Diagrams, illustrations.

Institution :

Submitted :

Magazanik, A.A.

AUTHOR: Magazanik, A.A.

109-10-19/19

TITLE: Asynchronous Double-frequency Regimes in the Oscillators having Two Degrees of Freedom (Ob asinkhronnykh dvukhchastotnykh rezhimakh v avtogeneratorakh s dvumya stepenyami svobody) (Letter to the Editor)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.10, pp. 1313 - 1316 (USSR)

ABSTRACT: V.V. Anisimov has recently published a paper (Ref.1) dealing with double-frequency, asynchronous oscillations. The problem was also investigated in the work of Schaffner (Ref.2). In both the works, it was shown that: the double-frequency oscillations are only possible in the systems with over-critical excitation; the self-excitation of the oscillations is impossible, and asynchronous oscillations are difficult to obtain experimentally. In the present work, it is shown that the above findings are not always true. A general analysis of the problem is attempted and it is found that in a single-tube oscillator having two degrees of freedom and operating at a low anode voltage and having an automatic grid bias, it is possible to obtain a stable two-frequency operation at a comparatively low excitation. If the oscillator system is such that the anode current is cut off below a certain grid voltage, again, it is possible to obtain a two-frequency

Card 1/2

109-10-19/19
Asynchronous Double-frequency Regimes in the Oscillators having
Two Degrees of Freedom.

operation. It is further found that the existence of a steady-state two-frequency regime and its stability are not directly dependent on the difference between the two resonance frequencies ω_1 and ω_2 and that, in general, it is not necessary to keep the difference small in order to secure this type of operation.

There are 6 references, 4 of which are Slavic and two references in the footnote on p.1316.

SUBMITTED: February 12, 1957.

AVAILABLE: Library of Congress.

Card 2/2

69176

S/106/59/000/11/011/013

9,9000

AUTHOR: Magazanik, A.

TITLE: Letter to the Editor: A Possible Method of Improving the Effectiveness of a u.h.f. Meteoric Communication System

PERIODICAL: Elektrosvyaz', 1959, Nr 11, pp 74-77 (USSR)

ABSTRACT: Experimental meteoric-burst communication⁸ systems do not, in practice, realise their theoretical capacity for transmitting information. One reason for this is the use of antennae having wide polar diagrams. The effectiveness of the system can be increased by having narrow-beam antennae and rapid-control of their direction, so that with each meteoric burst, the transmission and reception are in the direction of the meteoric trail. In such a system, at the commencement of each burst, the polar diagrams of the transmitter and receiver contract and rapidly turn to the direction of the new burst. The author calls such a system "A Rapid Meteoric-Trail, Volume Selection System BPVM-system". Such a system has the following advantages:

1. It uses high-gain antennae but preserves the wide-sector search properties.
2. It is simple to compensate for variation in the propagation time of the signals.
3. Mutual interference between systems is reduced.

The possibility of constructing such a system is based on

Card 1/2

69176

S/106/59/000/11/011/013

Letter to the Editor: A Possible Method of Improving the Effectiveness of a u.h.f. Meteoric Communication System

the following premises: 1) The stability of direction is ensured by the fact that for the greater part of meteoric bursts, the reflected signal is strongest at, or nearly at, the beginning of the burst. 2) The operation time of the antenna control apparatus can be an order less than the time of the shortest useable burst, and it is possible to exchange a wide polar diagram with a narrow frequency passband for a narrow polar diagram with a wide information passband. 3) Two meteoric bursts seldom overlap. 4) The transmitter and receiver use the same meteoric trail. 5) As the article shows, variations in the propagation time can be compensated by using information on the angle of incidence (Fig 2). There are 2 figures and 7 English references.

SUBMITTED: May 29, 1959.

Card 2/2

AUTHOR: Magazanik, A.A.

SOV/109-4-7-4/25

TITLE: The Qualitative Theory of the Asynchronous Regimes in the Oscillatory Systems with Two Degrees of Freedom

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 7, pp 1103 + 1115 + 2 plates (USSR)

ABSTRACT: The aim of this work is to investigate some qualitative aspects of the asynchronous regimes in oscillators with two degrees of freedom. The oscillators are similar to the conservative isochronous systems which can be analysed by assuming a model containing one or several complex non-linear elements. The principal equations for the amplitudes of the investigated systems can be based on the formulae derived by N.M. Krylov and N.N. Bogolyubov (Ref 3), which are in the form:

$$\frac{da_i}{dt} = \sum_{j=1}^n \lambda_{ij} (a_1, \dots, a_n) a_i \quad (i = 1, \dots, n) \quad (1)$$

Card1/9

SOV/109-4-7-4/25

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

In this, a_i is the amplitude of the i -th natural oscillation having a frequency $\omega_i \approx \omega_{oi}$, $\lambda_i(a)$ are certain amplitude functions which determine the so-called linearised damping coefficients $\gamma_i = -\gamma_{oi} \lambda_i(a)$, ω_{oi} and γ_{oi} are the frequencies and the damping coefficients of the natural oscillations in a corresponding linear system (i.e. when $\lambda_i \equiv -1$) and n is the number of degrees of freedom. In this work, only a certain type of the functions λ_i is considered. These are normally encountered in practical systems and can be represented as:

$$\lambda_i(a) = \xi_{Bi} L_{Bi}(a) - \xi_{Hi} L_{Hi}(a) - 1 \quad (2)$$

where $\xi_{Bi} L_{Bi} > 0$ and $\xi_{Hi} L_{Hi} > 0$ in the investigated
Card2/9 region of the amplitudes; the indices "B" and "H"

SOV/109-4-7-4/25

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

correspond to the excitation and load elements or functions of the system. ξ_{Bi} and ξ_{Hi} are frequency-dependent coefficients which are determined by the linear elements of the system; L_{Bi} and L_{Hi} are homogenised linear functions of resistances $R_{ri}(a)$ and conductances $S_{si}(a)$ of the non-linear elements of the system for the oscillation of frequencies ω_i . In an asynchronous regime, the resistances and conductances and, consequently, the functions L and λ are independent of the phase of the oscillations. If a system has two non-linear conductances (Figure 1) its λ_1 is given by Eq (3).

The quantities φ_{Bi} and η_i can be determined from the resistances of the system and two parameters χ_{Bi} and χ_{Hi} . For the oscillator shown in Figure 2, these

Card3/9 parameters are given by the second equation on p 1105.

SOV/109-4-7-4/25

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

The linearised conductance S_{si} of an inertialess non-linear element can be expressed by (Ref 3 and Yu.B. Kobzarev - Ref 5):

$$S_{si} = \frac{2}{(2\pi)^n a_{si}} \int_{-\pi}^{\pi} \dots \int_{-\pi}^{\pi} f_s(E + a_{s1} \cos \theta_1 + \dots + a_{sn} \cos \theta_n) \cos \theta_i d\theta_1 \dots d\theta_n \quad (4) .$$

This is valid for a frequency ω_i when the non-linear element is subjected to the interaction of n asynchronous oscillations having amplitudes $a_{s1}, a_{s2}, \dots, a_{sn}$ and a constant voltage E . The function f_s is a non-linear

Card4/9

SOV/109-4-7-4/25
The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

quantity which is characterised by a non-linear conductance. The above equations can be employed to investigate three types of non-linear elements:

- a) element of the type "A", such as represented by the anode circuit of a tube operating at a low anode voltage when the anode current can be represented by an exponential function;
- b) an element of the type "B", such as represented by a tube operating with a self-bias and satisfying the condition that the anode current is 0 for the grid voltages lower than the grid cut-off, and
- c) an element of the type "C", which corresponds to the grid circuit of a tube operating in the conditions when the grid current can be approximated by an exponential function.

On the basis of Eq (7), the linearised conductances for the elements of types "A" and "C" can be found from a system of transcendental equations (Eq 5). In a number of

Card5/9

SOV/109-4-7-4/25

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

practical cases, Eqs (5) can be solved comparatively simply. In particular, at large amplitudes and large grid-leak resistors R_C , the elements "A" and "C" can easily be determined; their values are given in the table on p 1108. The solution of Eqs (1) in the case of two degrees of freedom ($n = 2$) can be represented in the form of graphs plotted in a phase plane. Some qualitative characteristics of such a solution can be determined from the position of the curves of zero attenuation in the phase plane; these curves are branches of the isoclines $da_2/da_1 = 0$ and $da_2/da_1 = \infty$. Some phase-plane solutions are illustrated in Figures 3. The first seven graphs in Figure 2 are evaluated for the non-linear elements of the type "A" and "C". The remaining 3 graphs illustrate the properties of an oscillator with two degrees of freedom, which contains complex non-linearities.. Figure 4 represents a generalised family of basic isoclines $\lambda_1(a_i, a_j) = 0$

Card6/9

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

SOV/109-4-7-4/25

for a non-loaded oscillator; the isoclines were evaluated on the basis of Eq (6). The above theory is supported by the experimental results which are shown in the oscillograms of Figures 5, 6 and 7. The oscillograms were taken by employing the oscillator illustrated in Figure 2. It was found that the system could generate single- as well as double-frequency oscillations. The first seven graphs of Figure 3 correspond to the systems in which each of the basic isoclines consists of one stable branch. The first two of these graphs represent the systems with single-frequency oscillations; the remaining graphs illustrate the systems which can have several stable states, including single-frequency as well as double-frequency regimes. The last three graphs of Figure 3 represent the systems in which the basic isoclines have a stable and an unstable branch. The analysis of the systems described above can be carried out if their basic isoclines are known. The calculation of such isoclines may be difficult and it is sometimes necessary to

Card7/9

SOV/109-4-7-4/25

The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

determine them experimentally. The measurements can be effected by two methods. When the damping coefficients of the natural frequencies differ considerably, it is possible to obtain a slowly changing a_i . This method is illustrated in Figures 7a, B and 2. The isoclines in a system with one degree of freedom can be obtained by introducing an external force having an amplitude a_{BH} and determining the dependence of a_i on a_{BH} while slowly changing the latter. This type of isocline is shown in Figure 7d.

The contents of this article were read at the meeting of the Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi imeni A.S. Popova (Scientific-technical Society for Radio-engineering and Electrical Communications imeni A.S. Popov) on May 24, 1957.

Card8/9

SOV/109-4-7-4/25
The Qualitative Theory of the Asynchronous Regimes in the
Oscillatory Systems with Two Degrees of Freedom

There are 7 figures, 1 table and 9 references, of which
7 are Soviet and 2 English.

SUBMITTED: August 4, 1958

Card 9/9

66703

9.3260

AUTHOR: Magazanik, A.A.

SOV/109-4-8-23/35

TITLE: Some Properties of the Transient Processes in a Synchronous Oscillator With Two Degrees of Freedom Having Widely Differing Damping Coefficients of the Free Oscillations
 PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1359 - 1367 + 2 plates (USSR)

ABSTRACT: The approximate calculation of the transients in oscillatory systems with several degrees of freedom, which are near to conservative isochronous systems, can be performed by employing the Krylov and Bogolyubov amplitude equations (Ref 1):

$$\frac{da_i}{dt} = \gamma_{oi} \lambda_i (a_1, \dots, a_n) a_i \quad (i = 1, \dots, n) \quad (1)$$

The calculations can be simplified if the attenuation coefficients γ_{oi} of the natural oscillations of the system differ appreciably from each other. The article deals with the case of two degrees of freedom ($n = 2$) for

Card 1/7

66703

SOV/109-4-8-23/35

Some Properties of the Transient Processes in a Synchronous Oscillator With Two Degrees of Freedom Having Widely Differing Damping Coefficients of the Free Oscillations

which the approximate solution of Eqs (1) for $\kappa = \gamma_{02}/\gamma_{01} \gg 1$ or $\kappa \ll 1$ is particularly simple and instructive. This case occurs when one of the partial resonance circuits has a high quality factor in comparison with that of the other, while the de-tuning is sufficiently large. This occurs, for example, in a quartz-crystal oscillator or when the natural frequencies of the partial resonance circuits differ considerably. It is further assumed that $\kappa \gg 1$. The notation and the terminology employed is the same as that used in an earlier paper (Ref 3). For $n = 2$, the equation of the phase trajectories of Eqs (1) is given by:

$$\frac{da_2}{da_1} = \kappa \frac{\lambda_2(a_1, a_2)a_2}{\lambda_1(a_1, a_2)a_1} \quad (2) .$$

By analysing this equation, it is found that for $\kappa \gg 1$,

Card2/7

66703

SOV/109-4-8-23/35

Some Properties of the Transient Processes in a Synchronous
Oscillator with Two Degrees of Freedom Having Widely Differing
Damping Coefficients of the Free Oscillations

the field of the phase trajectories of Eqs (1) has the following properties (see Figures 1,2). In the vicinity of a_1 and near the basic isocline $\lambda_2 = 0$, the phase trajectories tend to converge together and form narrow "streams" which flow along the axis or along the isocline. The axis of the stream is a separatrix. Outside the streams, the phase trajectories ascend or descend steeply, being almost parallel to the axis a_2 . The streams near the stable segments of the basic isocline $\lambda_2 = 0$ and near the segments of the axis a_1 are stable in the sense that the phase trajectories entering such streams flow to the nearest steady-state point without emerging from them. The streams near the unstable segments or branches of the isocline $\lambda_2 = 0$ and near a_1 where $\lambda_2 > 0$ can be said to be unstable. The phase trajectories can pass along

Card 3/7

66703

SOV/109-4-8-23/35

Some Properties of the Transient Processes in a Synchronous
Oscillator with Two Degrees of Freedom Having Widely Differing
Damping Coefficients of the Free Oscillations

a certain length of an unstable stream, but then emerge from it and steeply ascend or descend to the nearest stable stream. An unstable stream is therefore gradually "dried up". The above properties of the phase picture are illustrated in Figures 1 and 2, where Figure 1 was evaluated for a symmetrical oscillator having a low excitation and containing non-linear elements of the type A and C (see Ref 3); the oscillator has three stable steady states, one with two frequencies and two with single frequencies. Figure 2 corresponds to a system with a comparatively low excitation level, which has only one single-frequency steady state. The actual phase trajectory of the case considered, i.e. for $\kappa \gg 1$ and $n = 2$, can be approximated by a broken line consisting of three segments: vertical straight-line segments B; segments of the axis $a_1(\Gamma)$ and segments of the basic isocline $\lambda_2 = 0(\Lambda)$. Examples of the position of various isoclines and various initial conditions

Card4/7

4

66703

SOV/109-4-8-23/35

Some Properties of the Transient Processes in a Synchronous
Oscillator with Two Degrees of Freedom Having Widely Differing
Damping Coefficients of the Free Oscillations

are shown in Figures 3. The phase trajectories can be approximately represented by Eqs (6), where a_{1BH} is the abscissa of the initial point, where a given B segment is started. The solutions of Eqs (1) for the three above segments can approximately be represented by Eqs (7), (8) and (9). By combining the segments and fitting the corresponding solutions, it is possible to obtain the transients. Some of the transients observed experimentally are shown in Figures 5, 6 and 7, while Figure 4 gives some oscillograms of the phase plane. The oscillograms were taken on a controlled quartz-crystal oscillator having two degrees of freedom; the position of the basic isoclines was similar to that of Figure 2. If the segment or stage \checkmark corresponds to an unstable stream, the majority of the phase trajectories come out of the stream and go into the segment B at various points of the stream. The position of such a point is strongly

Card5/7

66703

SOV/109-4-8-25/35

Some Properties of the Transient Processes in a Synchronous Oscillator with Two Degrees of Freedom Having Widely Differing Damping Coefficients of the Free Oscillations

dependent on the position of the initial point of the segment Δ . For $\kappa \gg 1$, the probability that the mapping point will come out from the unstable stream near the axis a_1 at its very origin is near to unity;

this holds for a system with a low excitation level with zero boundary conditions. In a system designed for the generation of single-frequency oscillations, the pulses containing the oscillations of the second frequency (which are produced during the transient phenomena) can be regarded as an interference or noise. From the analysis of the equations and the experimental data, it is found that rapid attenuation of the noise or interference pulses is achieved if the segments Δ of the trajectories are eliminated. Further, in order to produce single-frequency oscillations under any initial conditions, it is necessary that the position of the basic isoclines should correspond to those of Figure 2.

Card6/7

✓

66703

SOV/109-4-8-23/35

Some Properties of the Transient Processes in a Synchronous
Oscillator with Two Degrees of Freedom Having Widely Differing
Damping Coefficients of the Free Oscillations

There are 7 figures and 4 Soviet references.

SUBMITTED: August 4, 1958

X

Card 7/7

MAGAZANIK, G.L. (Leningrad)

Contribution of N.A.Vel'iaminov and his school to physical therapy.
Vop.kur., fizioter.i lech.fiz.kul't. 27 no.2:163-167 Mr-Apr '62.
(MIRA 15:11)

(VEL'IAMINOV, NIKOLAI ALEKSANDROVICH, 1855-1920)
(PHYSICAL THERAPY)

MAGAZANIK, Gersh Il'vovich; PARDANOV, A.I., red.

[Physical means of treating diseases at home] Fizicheskie sredstva lecheniia boleznei v domashnikh usloviakh. Leningrad, Meditsina, 1965. 70 p. (MIRA 18:2)

MAGAZANK, L. G. and USIENSKAYA, E. P.

"Proserin Bronchiospasm as an Experimental Model of an Asthmatic Condition," a report presented at the 570th meeting of the Pharmacology and Toxicology Section, Leningrad Society of Physiologists, Biochemists, and Pharmacologists im. I. M. Sechenov, 9 June 1954, Farm. i Toks., Ju-Aug. 1955, pp. 60-63.

1st Leningrad Medical Institute

Sum. 900, 26, Apr 1956.

MAGAZANIK, L.G., USPENSKAYA, Ye. P. (1st LENINGRAD MED. INST. in. ACAD. I.P. PAVLOV)

"Experimental Therapy of Bronchial Spasm Caused by Anticholinesterase Substances
and the Study of Medicinal Means for Treatment of Bronchial Asthma" (Eksperimental'
naya izyskaniye lekarstvennykh sredstv dlya lecheniya bronkhial'noy astmy)

Chemistry and Uses of Organophosphorous Compounds
(Khimiya i primeneniye fosfororganicheskikh soedineniy),
Trudy of First Conference, 8-10 December 1955, Kazan,
pp. Published by Kazan Univ. AS USSR, 1957
356-365.

MAGAZANIK, L. G., First Leningrad Medical Institute.

"Section of Pharmacology and Toxicology of the Leningrad Society of
Physiology, Biochemistry and Pharmacology imeni I. M. Sechenov,"
Farm. i Toks., v. 9, no 1, 1956, p. 63.

MAGAZANIK, L. G.

USSR / Pharmacology, Toxicology, Cholinergic Drugs. V

Abstr Jour : Ref Zhur - Biol., No 20, 1958, No 94256

Authors : Uspenskaya, Ye. P.; Magazanik, L. G.

Inst : Not given

Title : Experimental Therapy of Bronchospasm, Produced by the Anticholinesterases, and a Search for Medical Treatment of Bronchial Asthma.

Orig Pub : V sb.: Kachestva i primeneniye fosfororgan. so-
yedineniy. M., AN SSSR, 1957, 350-305.

Abstract : The effects of preparations of the pentaphene, diphenazine, alpramethyldiphenazine, diethylaminoacetyldiphenylamide and arpenal groups on bronchospasm caused by procaine on cats were studied. It is noted that iodidemethylates containing quadrivalent nitrogen atom possess a more marked medicinal and prophylactic effect than

Card 1/2

USSR / Pharmacology, Toxicology, Cholinergic Drugs. V

Abstr. Jour. : Red Zhur - Fiziol., No 20, 1958, No 24236

hydrochlorides with trivalent nitrogen. The most active of the preparations with tertiary nitrogen were arpenal and pentaphene, and with quaternary nitrogen, iodideethylnate of arpenal and pentaphene. Thus far, only pentaphene in a dose of 0.05 g 2-4 times per day was subjected to clinical examination for the duration of one week to two months for the treatment of bronchial asthma and it turned out to be quite effective.

Card 2/2

MAGAZANIK, L. G., Cand Med Sci (diss) -- "The mechanism and experimental therapy of spasms of the bronchi caused by certain cholinopositive substances". Leningrad, 1960. 16 pp (First Leningrad Med Inst im Acad I. P. Pavlov), 500 copies (KL, No 10, 1960, 136)

MAGAZANIK, I. E., MASTYUKOVA, T. A., ROZANOVA, YE. K., FURTYKOV, N. K.,
MIKHILSON, V. YA., KABACHNIK, M. I., YAKOVLEV, V. A., ZOLKHA, R. I.,
GOLOVINOV, M. N. (USSR)

"The Significance of Onic Group and of its Position in an
Anti-Cholinesterase Substance Molecule for its Inter-action
with Cholinesterases and for Pharmacologic Effects."

Report presented at the 5th International Biochemistry Congress,
Moscow, 10-16 August 1961

VOLKOVA, R.I.; GODOVIKOV, N.N.; KABACHNIK, M.I.; MAGAZANIK, L.G.;
MASTRYUKOVA, T.A.; MIKHEL'SON, M.Ya.; ROZHKOVA, Ye.R.;
FRUYENTOV, H.K.; YAKOVLEV, V.A.

Chemical structure and biological activity of phosphorus
organic cholinesterase inhibitors. Vop. med. khim. 7 no.3:
250-259 My-Je '61. (MIRA 15:3)

1. Laboratory for the Pharmacology and Biochemistry of
Biologically Active Compounds, "I.M. Sechenov" Institute of
Evolutionary Physiology, Academy of Sciences of the U.S.S.R.,
and Laboratory of Organophosphorus, Institute of Elementoorganic
Compounds, Academy of Sciences of the U.S.S.R., Leningrad.
(CHOLINESTERASES)
(PHOSPHORUS ORGANIC COMPOUNDS)

MAGAZANIK, L.G.

Capacity of some cholinolytic substances to prevent experimental
bronchial spasms produced by various methods. Farm. i tsk. 24
no.5:541-548 S-O '61. (MIRA 14:10)

1. Laboratoriya farmkologii i biokhimii biologicheskii aktivnykh
veshchestv (zav. - prof. M.Ya. Mikhel'son) Instituta evolyutsionnoy
fiziologii imeni I.M.Sechenova.
(PARASYMPATHOLYTICS) (BRONCHI)

MAGAZANIK, L.G.

Effect of adrenaline on cholinergic contraction of skeletal muscles
in birds. Dokl. AN SSSR 139 no.2:495-498 J1 '61. (MIRA 14:7)

1. Institut evolyutsionnoy fiziologii im. I.M. Sechenova AN SSSR.
Predstavleno akademikom V.N. Chernigovskim.
(ADRENALINE) (MUSCLES)